

NON-PUBLIC?: N
ACCESSION #: 8808220090
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Diablo Canyon Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000275

TITLE: Reactor Trip From High-High Steam Generator Level Protection Logic
Due To Inadequate Operating Procedure
EVENT DATE: 07/12/88 LER #: 88-021-00 REPORT DATE: 08/09/88

OPERATING MODE: 1 POWER LEVEL: 018

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Donald D. Malone, Regulatory Compliance Engineer
TELEPHONE #: 805-595-3751

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On July 12, 1988, at 1729 PDT, a reactor trip was initiated as a result of a steam generator high-high level during the performance of Operating Procedure (OP) L-3, "Secondary Plant Startup". The unit was stabilized in Mode 3 (Hot Standby) and the 4-hour nonemergency report required by 10 CFR 50.72(b)(2)(ii) was made at 1749 PDT.

The event was determined to have been caused by an inadequate OP L-3, which required the automatic control of main feedwater regulating valves prior to paralleling the turbine to the electrical power grid and establishing heated feedwater from the feedwater heater train. This method resulted in an inherently unstable steam generator level control that resulted in diverging control system oscillations.

To prevent recurrence, procedure OP L-3 has been revised to require paralleling the generator to the grid and establishing heated feedwater prior to automatic operation of the feedwater regulating valves.

(End of Abstract)

TEXT: PAGE: 2 of 4

I. Initial Conditions

Unit 1 was in Mode 1 (Power Operation) at approximately 18 per cent power.

II. Description of Event

A. Event:

On July 12, 1988, at 1729 PDT, with Unit 1 in Mode 1 (Power Operation) during the performance of plant startup activities Operating Procedure (OP) L-3, "Secondary Plant Startup", was used to place the turbine-generator in service. The procedure required the reactor power to be established at 18 to 20 per cent with the feedwater regulating valves in automatic control. When the feedwater regulating valves were placed into automatic control, increasing steam generator level swings were initiated, that resulted in a high-high steam generator water level turbine trip, feedwater pump trip and feedwater isolation. These conditions combined with the 10 per cent reactor power level interlock (P-7), initiated a reactor trip.

The unit was stabilized in Mode 3 (Hot Standby) and the 4-hour nonemergency report required by 10 CFR 50.72(b)(2)(ii) was made at 1749 PDT.

B. Inoperable structures, components or systems that contributed to the event:

None

C. Dates and approximate times for major occurrences:

1. July 12, 1988, at 1729 PDT: Event Date: Steam Generator High-High Level (P-14) setpoint was exceeded.

2. July 12, 1988, at 1749 PDT: The unit was stabilized and the 10 CFR 50.72(b)(2)(ii) 4-hour nonemergency report was made.

D. Other systems or secondary functions affected:

None

E. Method of discovery:

The event was immediately known to operations personnel due to alarms in the control room.

TEXT: PAGE: 3 of 4

F. Operator actions:

Upon receipt of reactor trip alarms, the plant operating personnel entered the appropriate Emergency Operating Procedures (EP E-0, "Reactor Trip or Safety Injection," and EP E-0.1, "Reactor Trip Response") and stabilized the unit in Mode 3 (Hot Standby) at approximately 536 degrees Fahrenheit (F) reactor coolant temperature.

G. Safety system responses:

Reactor trip breakers opened and all rods inserted into the core as designed.

III. Cause of Event

A. Immediate cause:

The automatic feedwater control system failed to control steam generator level below the high-high (P-14) level setpoint.

B. Root cause:

The root cause was determined to be that OP L-3 inappropriately required the feedwater regulating valves to be placed in automatic control, which resulted in the steam generator level oscillations, turbine trip, and reactor trip. The automatic feedwater control system is configured to provide optimized performance with the feedwater heater system in operation (i.e. with the turbine on line, loaded greater than 10 per cent power and feedwater heaters in service) which provides preheated feedwater to the steam generators. The automatic operation of the feedwater control system with cold (L-3 had been performed on the training simulator only, which did not fully demonstrate this instability.

OP L-3 was originally prepared as a result of previous plant problems identified by the Operations Feedwater Trip Reduction Task Force (See Sect. VI.B). The task force reviewed previous start up problems as well as other utility operating experiences and concluded that the start up performance would be improved by

developing a procedure to minimize transients on the system with the feedwater controls in manual. Accordingly, OP L-3 was written and reviewed by the task force members, operations training department, and control operators.

TEXT: PAGE: 4 of 4

IV. Analysis of Event

The steam generator high-high level signal causes a turbine trip, feedwater pump trip, feedwater isolation, and above 10 per cent reactor power (P-7 interlock) causes a reactor trip. The reactor trip is a conservative action of the reactor protection system and is a design feature of the unit. Based upon the above considerations, there were no adverse consequences or implications resulting from this event.

V. Corrective Actions

OP L-3 was revised to require paralleling the main turbine to the electrical power grid and establishing heated feedwater prior to placing the main feedwater control valves in automatic operation.

VI. Additional Information:

A. Failed components:

None

B. Previous LERs on similar events:

1. LER 1-87-002 Reactor Trip Due to High Steam Generator Level
2. LER 1-87-025 High Steam Generator Water Level Turbine Trip and Main Feedwater Isolation During Startup Due to Lack of Guidance for Operators on Proportional-Integral Controllers

Corrective actions for these events included an investigation of the steam generator level control problems by the feedwater trip reduction task force to reduce feedwater control related reactor trips (Also see PG&E letter DCL-87-136, dated June 15, 1987). As a result, OP L-3 was developed.

ATTACHMENT # 1 TO ANO # 8808220090 PAGE: 1 of 1

Pacific Gas and Electric Company 77 Beale Street James D. Shiffer

San Francisco, CA 94106 Vice President
415/973-4684 Nuclear Power
TWX 910-372-6587 Generation

August 9, 1988

PG&E Letter No. DCL-88-197

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Licensee Event Report 1-88-021-00
Reactor Trip from High Steam Generator Level Protection Logic
Due to Inadequate Operating Procedure

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed Licensee Event Report concerning a reactor trip initiated from steam generator high-high level protection logic due to an inadequate operating procedure.

This event has in no way affected the public's health and safety.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

/s/ W. B. KAEFER/for
J. D. Shiffer

cc: J. B. Martin
M. M. Mendonca
P. P. Narbut
B. Norton
H. Rood
B. H. Vogler
CPUC
Diablo Distribution
INPO

Enclosure

DC1-88-OP-N080

2256S/0062K/DY/2118

*** END OF DOCUMENT ***
